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Defense Acquisition Executive Summary (DAES) Report

THAAD System

Submission Date: 25 March 1997

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THAAD System
Section 1 - Executive Summary

March 1997
Prepared: 01 Mar 97

1. Executive Summary

a. Program Issues

[U] Program Budget Decision (PBD) 224, issued 11 Dec 96, increased the THAAD program \$722M (FY 98-03) to accelerate the First Unit Equipped milestone from FY06 to FY04. This increase includes funding for additional UOES testing and the second EMD radar which are necessary for the acceleration of the program. The PBD 224, Change 3, moved procurement funding responsibility from BMDO to the Army. The first year of procurement funds is programmed for FY01.

Following the PBD 224 program increase, project office and Lockheed Martin Missiles and Space (LMMS)/Raytheon personnel have been intensely reviewing the FUE FY04 program structure to ensure the program can be executed at a moderate level of risk. Due to flight test 07 (FT-07) anomalies (as discussed under Significant Developments), preliminary analyses indicate that FUE will slip to 1st Qtr, FY05. Project office personnel are also holding discussions with the user about the feasibility of refining the definition of FUE.

Failure to obtain an intercept during FT-07 has caused a three-month PDRR program extension. This slip will cause a breach to the schedule portion of the approved Acquisition Program Baseline. An extension is also envisioned for Milestone III, which will increase the cost of the R&D program; cost estimates will be refined in March-April. A Program Deviation Report will be submitted in accordance with DoD regulation 5000.2-R.

The Overarching Integrated Product Team (OIPT) will convene on 1 May, primarily to approve the remaining PDRR flight test program. A complete cost and schedule laydown of the refined program will be presented.

LMMS is working jointly with the THAAD Project Office, PEO AMD, and BMDO to develop and implement an over-target schedule and over-target baseline (OTB) for the current PDRR contract. Issues identified in February during the first management review of the planned OTB necessitated further review, causing a delay in OTB finalization. Current plans call for the OTB to be established by month-end March with cost and schedule data reported to TPO by month-end April.

b. Significant Developments Since Last Report

[U] Flight test 07 was scheduled for 28 Feb, but was delayed due to high altitude winds. The test was conducted on 6 Mar with the primary objective of successfully demonstrating a high endo-atmospheric, body-to-body intercept of a Hera target. A successful intercept was

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not achieved. Preliminary indications are that the THAAD Radar, Launcher, and Battle Management/Command, Control, Communications, and Intelligence (BM/C3I) segments performed nominally. The THAAD Radar acquired the target in its primary search fence and the THAAD BM/C3I segment calculated an engagement solution. The THAAD Energy Management System maneuver, flare deployment, booster separation, and shroud separation appeared to be successfully performed. In addition, the seeker appeared to operate properly. Though the avionics computer issued commands to the Divert and Attitude Control System (DACS) in response to in-flight target updates from the THAAD Radar, the DACS motors apparently did not fire. As a result, the kill vehicle could not make the minor corrections necessary to acquire, track, and intercept the target. A flight test failure investigation has been initiated.

PBD 224, issued 11 Dec 96, increased the THAAD program \$722M (FY98-03). PBD 224, Change 3, moved procurement funding responsibility from BMDO to the Army.

An EMD pre-award partnering effort commenced 21 Jan. This effort was to assure that appropriate government and contractor personnel have a complete and common understanding of the Integrated Product and Process Management/Integrated Product and Process Development requirements of the Request For Proposal and the proper application to both the proposal preparation and contract execution. The pre-award partnering process would provide enhanced communications, understanding and early issue resolution and should therefore lead to more effective, streamlined negotiations and a better EMD contract. The partnering effort has been postponed following FT-07.

A reprogramming action occurred 18 Feb 97 which moved \$203.6M from EMD to PDRR. This action was necessary to complete the PDRR phase of the contract and prepare for the EMD award.

The last of three small scale propellant characterization tests, a shotgun test, was successfully conducted 16 Dec. The tests were conducted as a subset of THAAD's Insensitive Munitions and Hazard Classification testing. The results of the tests showed that the THAAD missile propellant will not detonate when exposed to a high explosive donor under highly confined and unconfined conditions and that the propellant's resistance to mechanical damage is twice as good as that of similar propellants. As a result, some of the standard insensitive munitions/final hazard classification tests will not have to be conducted on the THAAD missile. These include the sympathetic detonation tests, shape charge jet test, spall test, the confined stack test, and others.

TPO is changing the baseline seeker from PtSi to InSb to support subsequent flight tests as early as Jun 97. InSb will be the baseline seeker with the remaining PtSi seekers potentially being used to reduce flight test program risks.

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A UOES Production Preparedness Review was conducted on 28 Jan. The review resulted in definition of the products and plans necessary to exercise the 40 missile option. The option will be exercised following a successful intercept and successful hardware-in-the-loop demonstrations of the InSb seeker's performance.

The UOES Radar was transported by ground, air, and sea to Kwajalein Missile Range in Dec 96. The radar has participated in several tests where useful data was collected and used to validate and modify radar algorithms. Radar System Test-2 was successfully conducted 28 Feb. All mission objectives were achieved. The radar detected, tracked, classified, discriminated, and collected data for post mission analysis.

THAAD and Patriot successfully exchanged theater ballistic missile track data during the Interoperability Tests at the Army Missile Command Software Engineering Directorate in Jan 97. These tests were representative of the capability that will be demonstrated at Roving Sands 97 during the Air and Missile Defense Task Force Demonstration. This was THAAD's first successful exchange of TADIL J data with an external source which was not emulated.

2. Baseline Information/History

[U] Program Type: DAB

Next Review: APR 98 Review Type: MSII

Next RFP: AUG 97

No Data Entered.

THAAD System

Initial Plan RDT&E APB Date: 28 Jan 92

Current Plan RDT&E APB Date: 10 Sep 96

Total Number of Baselines: 3

Total Number of Current Parameters: 36

Cost: 6

Performance Characteristics: 15

Milestones: 15

3. Mission and Description

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THAAD System
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[U] The mission of the Theater High Altitude Area Defense (THAAD) system is to defend against Theater Ballistic Missiles (TBMs) at long ranges and high altitudes. THAAD's long range capability will protect U. S. and allied Armed Forces, broadly dispersed assets and population centers against TBM attacks. THAAD's capability to intercept at high altitudes allows multiple intercept opportunities and will significantly mitigate the effects of weapons of mass destruction. The THAAD System consists of missiles, launchers, radar(s), battle management/command, control, communications, computer and intelligence (BM/C4I) units, and support equipment. The THAAD radar utilizes state-of-the-art radar technology to accomplish its required functions of threat attack early warning, threat type classification, interceptor fire control, external sensor cueing, launch and impact point estimation, and kill assessment after intercept. The THAAD program includes an option for building 40 missiles which will be a part of a prototype called the User Operational Evaluation System (UOES). In addition to the 40 missiles, the UOES consists of 4 launchers, 2 BM/C4I units, 2 radars, and support equipment. The UOES will be used for early operational assessment and testing, allowing the user to influence the design in the development process. Additionally, the UOES will be available for a Commander-in-Chief to consider deploying during a national emergency. The THAAD System does not replace another system.

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THAAD System
Section 2 - Assessments

March 1997
Prepared: 01 Mar 97

THAAD System

Program Assessment Indicators	Assessment	Class
Performance Characteristics	GA	[U]
Test & Evaluation	Y	[U]
Logistics Requirements & Readiness Objectives	G	[U]
Cost	Y	[U]
Funding	G	[U]
Schedule	R	[U]
Contracts	GA	[U]
Production	G	[U]
Management Structure	G	[U]

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THAAD System
Section 3 - Program Manager's Comments

March 1997
Prepared: 01 Mar 97

THAAD System

[U] Explanation of GA in Performance Characteristics

- [U] The number of Key Performance Parameters (KPPs) has been changed in the proposed update to the service ORD. Those KPPs will be included in the revised Acquisition Program Baseline (APB). Joint staffing (two-star level) and the JRB will review the ORD before the MSII decision to preclude major issues with the JROC validation.

[U] Explanation of Y in Test & Evaluation

- [U] The THAAD FT-06 mission, conducted 15 Jul 96, failed to achieve intercept due to a seeker anomaly which resulted in saturation of the focal plane array and overload of an avionics processor. Corrective actions were incorporated on THAAD FT-07 to prevent reoccurrence of failure mode. THAAD FT-07 failed to achieve intercept. Preliminary indications are that the THAAD Radar, Launcher, and Battle Management/Command, Control, Communications, and Intelligence (BM/C3I) segments performed nominally. Though the avionics computer issued commands to the Divert and Attitude Control Systems (DACS) in response to in-flight target updates from the THAAD Radar, the DACS motors apparently did not fire. As a result, the kill vehicle could not make the minor corrections necessary to acquire, track, and intercept the target. A flight test failure investigation has been initiated.

The THAAD T&E IPT approved plans to incorporate the InSb seeker and UOES Radar on FT-08, tentatively scheduled Jun 97, and also concurred with PDRR flight test plans to conduct a total of 11 flights to meet the requisite MSII requirements and address additional risk mitigation for UOES and EMD. THAAD EMD T&E plans are coordinated/documented in a Draft THAAD Test and Evaluation Master Plan (Milestone II Update) and reflect the requirements of the T&E IPT, with no known issues regarding the scope of testing or defined T&E strategy. Responding to EMD schedule risk issues raised by the T&E IPT regarding the executability of the THAAD FUE 04 EMD program, we have been addressing cost/schedule/performance issues through "EMD RFP Partnering" with the prime contractor (LMMS) and Raytheon to mitigate program risks.

[U] Explanation of G in Logistics Requirements & Readiness Objectives

- [U] The US Army Ordnance Missile and Munitions Center and School (USAOMMCS) and the US Army Air Defense Artillery School (USAADASCH) are in disagreement as to which Military Occupational Specialty (MOS) should perform unit level maintenance for the THAAD System. It is the position of the USAOMMCS that the unit level maintainer should be Ordnance personnel. USAADASCH contends that the Air Defense Enhanced Operator personnel are more appropriate for unit level maintainer. Due to this unresolved issue, the Office of the Deputy Chief of Staff for Logistics will rate Logistics "yellow" in the next Monthly Acquisition

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THAAD System
Section 3 - Program Manager's Comments

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Prepared: 01 Mar 97

Program Review. This is a US Army Training and Doctrine Command internal issue, but will impact maintenance planning for the THAAD program. Regardless of which MOS performs the maintenance, the THAAD maintenance concept will consist of three levels--Unit, Direct Support and Depot Maintenance.

[U] Explanation of Y in Cost

- [U] Due to the PDRR flight test program's slipping over the past several months, the prime contract with Lockheed Martin Missiles & Space (LMMS) has continued to overrun. The THAAD Project Office is currently working with LMMS to establish a second Over-Target-Baseline for cost and schedule, with plans to have the revised baseline in place at month-end March 1997. Another facet of PDRR program cost is that the revised flight test program will also require Raytheon to provide radar support for the remaining flight tests. While initial estimates of increases to both contracts' costs appear to be within the bounds of THAAD's programmed funding, the overall cost of the system will increase due to the program slips. An extension is also envisioned for Milestone III, which will increase the cost of the R&D program; cost estimates will be refined in March-April. In order to deal with internal issues and processes which have contributed to their increased contract cost, LMMS devised a Resolution Plan (which was approved by the Army). This plan is now in place at LMMS, and its milestones are being met.

[U] Explanation of G in Funding

- [U] A reprogramming action occurred in Feb 97 which moved \$203.6M from EMD to PDRR. This action was necessary to complete the PDRR phase of the contract and prepare for the EMD award. The EMD line retains \$62.7M which has been designated for the second EMD radar.

[U] Explanation of R in Schedule

- [U] THAAD continues to be managed on an "event-oriented" approach. However, four milestones recently approved in the APB have breached their threshold. This is due to longer than expected flight test-06 (FT-06) failure investigation and flight test-07 (FT-07) preparation, plus the FT-07 non-intercept. FT-06, conducted on 15 Jul, had a seeker anomaly which caused half of the focal plane array to become inoperative. The ensuing five-month failure investigation determined that the most likely cause was contamination. The FT-06 failure investigation caused FT-07 to move from Sep to Dec 96. An inertial measurement unit software error, found during software verification testing of FTV-07, further delayed the flight test to Mar 97. Following the failure during FT-07 to achieve intercept, initial schedule analyses indicate that new dates for Milestone II DAB Review, THAAD EMD Contract Award, Milestone III DAB Review, and Full Rate Production Contract Award will slip beyond their thresholds. A Program Deviation Report will be forwarded IAW DoD regulation 5000.2-R.

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THAAD System
Section 3 - Program Manager's Comments

March 1997
Prepared: 01 Mar 97

[U] Explanation of GA in Contracts

- [U] The PDRR Lockheed contract has been extended 13 months to 3 Oct 97. Plans are to further extend the contract in accordance with the most recent plans to complete the PDRR flight test program. The test program also requires Raytheon to provide radar support for the remaining flight tests.

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THAAD System
Section 4 - PEO Comments

March 1997
Prepared: 01 Mar 97

THAAD System

- [U] Failure to obtain a successful body to body intercept during FT 07 will cause a 3 month extension in the program. As a result, there will be a breach of the schedule portion of the APB and an increase in program cost. The PM is preparing a program deviation report. The effect of PBD 224 and PBD 224 Change 3 will be incorporated into the new APB.

A test failure investigation has been initiated, and teams have been formed to analyze selected portions of the program. The PM, PEO, BMDO and LMMS will all work together to determine impacts and develop recommended adjustments to the program.

The PM currently plans to implement the OTB by the end of March, although some replanning is required because of the slip in MS II. The schedule for OTB implementation in March is aggressive but appears viable at this time.

Section 4 - CAE Comments

THAAD System

- [U] I am concerned about the recent THAAD FT-07 non-intercept and its impact on program execution. As a result of this most recent flight test failure, I have chartered two teams to perform separate independent assessments of both the THAAD missile design and the total program to determine if the THAAD system is capable, within acceptable risk, of addressing warfighter needs for an effective upper-tier Theater Missile Defense system. The independent assessment I've chartered will be headed by an Executive Steering Group (ESG) which I will head. Initial findings will be briefed to the ESG no later than April 15, 1997. A final briefing will be prepared and available for senior DoD leadership no later than April 22, 1997.

The Program Manager is forwarding a Program Deviation Report, dated Mar 11, 1997, to reflect the breach to four Acquisition Program Baseline (APB) schedule milestones. A revised APB is forthcoming. Per the September 10, 1996, OUSD (A&T) memorandum, the revised APB will contain the technical performance requirements contained in the THAAD system's new Operational Requirements Document (ORD).

BMDO and the Army are also evaluating PD&RR activities through contract completion in order to establish a second Lockheed contract Over Target Baseline (OTB) and Estimate-At-Completion. The new OTB will be implemented in April 1997.

In the previous DAES, I indicated that I would chair an independent assessment of the THAAD OTB. This effort is not yet complete and will be reflected in our next report.

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THAAD System
Section 4 - CAE Comments

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Near-term priorities for the program are: FT-07 failure analysis and resolution; completion of the Independent Assessment of the THAAD program; conduct FT-08; OTB implementation in April; and submission and approval of a revised APB.

As the executing agent for THAAD, PEO-MD primarily manages the missile and radar integration for the THAAD program. The information regarding these components was provided by PEO-MD. In reporting the total program status, BMDO, which centrally manages the targets program, provides the target information.

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THAAD System
Section 5 - Approved Program Data
1. Performance Characteristics

March 1997
Prepared: 14 Mar 97

U) ** AEGIS/Vertical Launch System (VLS) Compatibility. The joint Navy PEO (TAD), Army PEO (MD), and BMDO study, completed Dec 94, assessed the scope of the effort required to integrate the THAAD interceptor with the Navy AEGIS Combat System. The study also indicated significant compatibility between the AEGIS platform and THAAD missile subsystems. The study also identified and reconfirmed the areas requiring further development of interfaces between the THAAD and AEGIS systems. The AEGIS/THAAD System can perform all critical engagement functions. Use of Navy boosters with the THAAD kill vehicle would reduce booster/VLS interfaces. A reassessment of the safety hazard of Divert and Attitude Control System fuels on Navy ships warrants further review. The Army is also providing TMD expertise to support the Navy Theater Ballistic Missile Defense (TBMD) Cost and Operational Effectiveness Analysis (COEA) effort.

THAAD is currently participating in the Navy COEA Phase II. The objective of Phase II is to assess the cost and effectiveness of potential Navy Theater Wide (NTW) TBMD concepts. The four interceptor alternatives being analyzed are LEAP, Advanced Missile, and two THAAD derivatives. The Army will provide continuous expert support to the Navy COEA. Accomplishments to date include:

- developed and agreed with the Navy on a COEA support plan
- agreed with Navy on required funding
- established POCs in the technical areas and initiated two-way data exchanges
- attended meetings and walk-through of "special study" war rooms
- initiated evaluation of the THAAD derivative designs in the Navy system concept
- submitted initial entries into the Army Concept Position Report

The Navy COEA Phase II is scheduled to be completed during Jun 97. The results will be used to support a milestone decision on the NTW Program. The acquisition milestone to be sought is dependent on the concept selected.

Congressional Language Compliance - The congressional language in the National Defense Authorization Act for FY97 recommends up to \$10M from the THAAD Program, PE 0604861C, be utilized to study the key modifications required for the THAAD Kill Vehicle to be a candidate for the Navy Theater Wide mission. Congress also requested the Navy to fund up to \$10M for the THAAD Kill Vehicle modifications and up to \$10M for the development of the new second stage motor. The BMDO Joint System Engineering Team will be retaining the entire \$30M from the funding increases provided by Congress and will develop a plan for expending these funds.

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THAAD System
Section 5 - Approved Program Data
2. Program Schedule Milestones

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THAAD System

Approved Program Schedule Milestones

Schedule Milestones	Initial Concept Baseline Objective	Current Concept Baseline Objective/ Threshold	PM's Current Estimate	
Army Concept Definition Studies Complete	MAY 92	MAY 92 /NOV 92	MAY 92	[U]
Milestone I Review	JAN 92	JAN 92 /JUL 92	JAN 92	[U]
THAAD Dem/Val Contract Award	JUN 92	JUN 92 /DEC 92	SEP 92	[U]
GBR Dem/Val Contract Award	JUN 92	SEP 92 /MAR 93	SEP 92	[U]
Integrated System Test Start	JUL 95	OCT 95 /APR 96	SEP 95	[U]
System Delivery Complete (Less Missiles and Radars)	JUL 96	AUG 97 /FEB 98	FEB 98	[U]
Delivery of Optional 40 UOES Missiles Complete	TBD	TBD /TBD	FEB 00	[U]
Milestone II DAB Review	JUL 96	JUL 97 /JAN 98	APR 98	[U]
THAAD EMD Contract Award	AUG 96	AUG 97 /FEB 98	APR 98	[U]
GBR EMD Contract Award	AUG 96	N/A	N/A	[U]
LRIP Review	FEB 99	NOV 02 /MAY 03	SEP 02	[U]
Milestone III DAB Review	JUL 01	SEP 04 /MAR 05	MAY 05	[U]
Full Rate Production Contract Award	N/A	NOV 04 /MAY 05	JUN 05	[U]
FUE	JUL 01	FEB 06 /AUG 06	DEC 04	[U]
IOC	TBD	TBD /TBD	TBD	[U]

Other Significant Schedule Milestones

No data entered.

- [U] Several factors have contributed to movement of seven milestones, including Program Budget Decision (PBD) 224, 11 Dec 96; review of executability of an FUE FY04 program; and extension of PDRR caused by the FT-07 non-intercept. Milestone movement is Delivery of Optional 40 UOES Missiles Complete from Oct 99 to Feb 00; Milestone II DAB Review from Jan 98 to Apr 98; THAAD EMD Contract Award from Feb 98 to Apr 98; LRIP Review from Nov 02 to Sep 02; Milestone III DAB Review from Dec 04 to May 05; Full Rate Production Contract Award from Jan 05 to Jun 05; and FUE from Feb 06 to Dec 04.

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THAAD System
Section 5 - Approved Program Data
3. Approved Program Acquisition Cost

March 1997
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THAAD System

Program Base Year: 1988

	Initial Plan RDT&E APB Objective	Current Plan RDT&E APB Objective/ Threshold	PM's Current Estimate	Class
Base Year Costs				
Development (RDT&E):	3165.2	4454.9/5123.1	4736.5	[U]
Procurement (PROC):	3267.1	4101.3/4716.5	3965.3	[U]
MILCON:	26.6	27.6/31.7	27.3	[U]
Acquisition O&M:	0.0	0.0/0.0	0.0	[U]
Total Base Year Costs:	6458.9	8583.8/9871.3	8729.1	[U]
Acquisition O&S:				[U]
Total BY Life Cycle Costs:	6458.9	8583.8/9871.3	8729.1	[U]
Then Year Costs				
Development (RDT&E):	4323.7	5955.2	6339.6	[U]
Procurement (PROC):	5613.2	6746.0	6418.8	[U]
MILCON:	44.9	40.2	40.7	[U]
Acquisition O&M:	0.0	0.0	0.0	[U]
Total Then Year Costs:	9981.8	12741.4	12799.1	[U]
Quantities				
Development (RDT&E):	0	0	0	[U]
Procurement (PROC):	80	1233	1233	[U]
Unit Cost				
Avg Proc Unit Cost (BY \$M):	40.839	3.326/3.825	3.216	[U]
Avg Proc Unit Cost (TY \$M):	N/A	N/A	5.206	[U]

[U] The PM's Current Estimate is based on CPS FA97-6 FINALA, Feb 97 (FY96-97), CPS FY98-99 PB FINAL, Jan 97 (FY98-03), and the BMDO cost position (FY04-11) dated 19 Dec 96.

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THAAD System
Section 6 - Program Background Data
1. Track To Budget

March 1997
Prepared: 01 Mar 97

a. RDT&E Program Element (PE) & Project Data

PE/Proj Num	PE/Project Name	SAR
		N [U]
0603861C	THAAD Dem/Val Program	Y [U]
0603872C	Other TMD	Y [U]
0604861C	THAAD EMD Program	Y [U]

b. Procurement Annex Line Item (PALI) Data

Appn Code	Item Number	Control Type	Cost BA BSA	PALI Name	SAR
0300D	0208861C			THAAD System Procurement	N [U]

c. MILCON Program Element (PE) Data

PE Number	PE Name	SAR
0604861C	THAAD System EMD Program	N [U]

d. O&M Program Element (PE) Data

No current O&M PEs.

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THAAD System
Section 6 - Program Background Data
2. Unit Cost Report - (Dollars in Millions)

March 1997
Prepared: 01 Mar 97

THAAD System

Classification: [U]

	Current Estimate MAR 97	UCR Baseline SEP 96 APB	Percent Change
a. Program Acquisition			
Unit Cost (PAUC)			
(1) Cost (BY\$)	0.0	0.0	
(2) Quantity			
(3) Unit Cost	N/A	N/A	0.00
b. Average Procurement			
Unit Cost (APUC)			
(1) Cost (BY\$)	0.0	0.0	
(2) Quantity			
(3) Unit Cost	N/A	N/A	0.00

[U] Unit Cost Reporting is not required for pre-Milestone II programs in accordance with Section 2433, Title 10, U.S.C.

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THAAD System
Section 6 - Program Background Data
3. Procurement Delivery Information

March 1997
Prepared: 01 Mar 97

THAAD System

No data entered.

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Section 6 - Program Background Data

Prepared: 01 Mar 97

4. Program and Contract Cost Info Summary - (TY Dollars in Millions)

Appropriation: RDT&E

	PMCEPAC Budgeted by PM	PMCEPAC Budgeted by Other Sources	Class
a. Completed Contracts	195.5	106.4	[U]
b. Large Active Contracts			
(1) THAAD PDRR	1504.5	0.0	[U]
DASG60-92-C-0101 CPFF			
(2) GBR PDRR	560.3	0.0	[U]
DASG60-92-C-0184 CPIF/AF/FF			
c. Small Active Contracts	51.4	159.5	[U]
d. Non-contract Cost	679.2	5.4	[U]
e. Management Reserve	0.0	0.0	[U]
f. Future Contract Effort	3028.1	49.3	[U]
g. Total RDT&E	6019.0	320.6	[U]

[U] RDT&E funding is based on CPS FA97-6 FINALA, Feb 97 (FY96-97), CPS FY98-99 PB FINAL, Jan 97 (FY98-03), and the BMDO cost position (FY04) dated 19 Dec 96.

It includes THAAD System PDRR, EMD, PDRR and EMD Targets, Lethality, OT&E, and FY96 Project Personnel & Support.

PMCEPAC Budgeted by Other Sources consists of THAAD System targets (PMAs A3354, A2260, and A2154) and lethality which are managed by the U.S. Army Space and Strategic Defense Command.

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THAAD System

Section 6 - Program Background Data

March 1997

Prepared: 01 Mar 97

4. Program and Contract Cost Info Summary - (TY Dollars in Millions)

Appropriation: Procurement

	PMCEPAC Budgeted by PM	PMCEPAC Budgeted by Other Sources	Class
a. Completed Contracts	N/A	N/A	[U]
b. Large Active Contracts			
(1) THAAD PDRR			[U]
DASG60-92-C-0101 CPFF			
(2) GBR PDRR			[U]
DASG60-92-C-0184 CPIF/AF/FF			
c. Small Active Contracts	N/A	N/A	[U]
d. Non-contract Cost	801.0	N/A	[U]
e. Management Reserve	N/A	N/A	[U]
f. Future Contract Effort	5617.8	N/A	[U]
g. Total Procurement	6418.8	0.0	[U]

[U] Procurement funding is based on the Army President's Budget (FY98-03) and the BMDO cost position (FY04-FY11) dated 19 Dec 96.

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Prepared: 01 Mar 97

4. Program and Contract Cost Info Summary - (TY Dollars in Millions)

Appropriation: MILCON

	PMCEPAC Budgeted by PM	PMCEPAC Budgeted by Other Sources	Class
a. Completed Contracts	0.0	0.0	[U]
b. Large Active Contracts			
(1) THAAD PDRR			[U]
DASG60-92-C-0101 CPFF			
(2) GBR PDRR			[U]
DASG60-92-C-0184 CPIF/AF/FF			
c. Small Active Contracts	0.0	0.0	[U]
d. Non-contract Cost	0.0	0.0	[U]
e. Management Reserve	0.0	0.0	[U]
f. Future Contract Effort	40.7	0.0	[U]
g. Total MILCON	40.7	0.0	[U]

[U] MILCON funding is based on CPS FA97-6 FINALA, Feb 97 (FY96), CPS FY98-99 PB FINAL, Jan 97 (FY98 and out)

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5. International Cooperative Program

March 1997
Prepared: 01 Mar 97

THAAD System

[U] None.

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6. Joint Potential Designation

March 1997
Prepared: 01 Mar 97

THAAD System

Class

- a. Proposed Other Component Involvement: None
- b. Date of JROC Assessment of Designation: 25 Nov 91

[U]

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Section 6 - Program Background Data
7. Procurement/Platform Support

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Prepared: 01 Mar 97

THAAD System

None. () Research & Development, Army, Other

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THAAD System
Section 7 - Supplemental Contract Cost Information

March 1997
Prepared: 01 Mar 97

** CONTRACT IDENTIFICATION DATA **

1. PROGRAM NAME THAAD System		2. CONTRACT NAME THAAD PDRR		3.CONTRACTOR (NAME & LOCATION) Lockheed Martin Missiles & Space Sunnyvale, CA 94088-3504	
4a.CONTRACT NUM DASG60-92-C-0101	4c.CONTRACT TYPE CPFF	4d.CONTRACT DEL TOT QTY: 0 PLAN QTY: 0 DEL QTY: 0		8. TARGET PRICE 1504.5 CEILING PRICE N/A	
4b.CHANGE ORDER NUM P00134					
5. PROGRAM PHASE PDRR	6. NEGOTIATED COST: 802.4	7. AUTHORIZED UNPRICED WORK: 78.5			

** CONTRACT SCHEDULE DATA **

9. CONTRACT DEFN DATE: 04 Sep 92	11. CRITICAL MILESTONE 1: COMPLETE FLT 7 MAR 97	12. CRITICAL MILESTONE 2: COMPLETE SYSTEM TEST FEB 98	13. SIG EFF COMPLETION DATE: FEB 98
10. WORK START DATE: SEP 92			14. EST COMPLETION DATE: APR 98

** CONTRACT PERFORMANCE DATA **

	15. Report Date 26 Jan 97	16. Source Document CPR	17. Data Verification Review Type: SAR Review Date: FEB 93
18. BCWS 1016.9	19. BCWP 1000.9	20. ACWP 1170.0	21. Mgt Reserve 18.3
22. Cont Budg Base 881.0	23. Total All Budg 1109.3	24. Contr's Est Cost 1431.3	25. PM's Est Cost Current: 1431.3 Best: 1431.3 Worst: 1504.7

** OVER TARGET BASELINE **

26. Date: AUG 94	Cost Adj: -88.5	Schedule Adj: -18.7
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THAAD System
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** CONTRACT VARIANCE DATA **

Cost Variance =	-169.1	Schedule Variance =	-16.0
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THAAD System
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Prepared: 01 Mar 97

27. Contract Comments

[U] (6) Negotiated cost increased \$12.1M this quarter due to the definitization of four change orders and an equitable adjustment to the contract.

(7) Authorized Unpriced Work increased a net \$61.1M this quarter due to the removal of four change orders that were definitized and the addition of two new change orders that were issued.

(8) Target Price increased \$176.3M this quarter due to the addition of two change orders to authorized unpriced work, the adjustment of the proposed value of four change orders that were definitized, the addition of an equitable adjustment, and the increase in projected overrun on the contract.

(14) Estimated Completion Date changed from Feb 98 to Apr 98 this quarter. Although the last flight test is scheduled for late Feb 98, the contract is expected to continue through Apr 98 to allow flight data analysis.

(22) and (23) Contract Budget Base and Total Allocated Budget increased \$73.3M this quarter due to the addition of two change orders to authorized unpriced work, the adjustment of the proposed value of several change orders that were definitized, and the addition of an equitable adjustment.

(24) Contractor's Estimated Cost increased \$170.3M this quarter due to the addition of two change orders to authorized unpriced work, the adjustment of the proposed value of four change orders that were definitized, the addition of an equitable adjustment, and the increase in projected overrun on the contract.

(25) PM's Estimated Costs increased this quarter. The best case and current Estimates At Completion (EAC) are based on the current Lockheed LRE which reflects a completion date of 30 Apr 98. TPO and Lockheed personnel are continuing to develop an over-target-baseline. TPO and Lockheed management recently reviewed the jointly developed bottom-up estimate-to-complete and identified several issues. Another joint management review is scheduled for early March, and plans are to establish the OTB and incorporate it into the March CPR (to be delivered to TPO month-end April). The PM's worst case EAC reflects the preliminary OTB that was developed prior to the joint management review. When the issues that were identified at that review are resolved, that number is expected to decrease. Once this OTB process is completed and the OTB is established, the EACs will be adjusted accordingly.

The EAC using the cumulative CPI is \$1296.8M. Independent analysis for the LMMS DCMC reflects an EAC of \$1509.3M

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Schedule Variance:

The cumulative schedule variance improved a net \$.2M this quarter to -\$16.1M or 1.6% unfavorable through January. Negative variances associated with the delay of Launcher/ILS spares material this quarter were offset by positive variances based on accomplishment of past due tasks in radar integration and the in-flight survivability effort, as well as successful testing associated with the liquid warm gas pressurization system. Cumulative schedule variance continues to be due to delays in obtaining seekers and the overall delays in the flight test program.

Cost Variance:

The cumulative cost variance worsened \$34M this quarter to -\$169.1M or 16.9% unfavorable through January. The negative cost variance this quarter is primarily due to labor and labor related other direct costs in all areas that are accumulating with no budget due to the extension of flight test schedule. Other contributing factors to the variance have been underestimation of requirements to complete objective system specifications and requirements associated with MSII preparation; increases in staffing in response to the Resolution Plan; increases in Litton effort, to meet contractual schedules (primarily Build 2.2); and continued effort at LMIRIS in seeker production and investigation of flight test anomalies. The cumulative cost variance continues to be due to increased costs associated with seeker development/production, BMC4I development, test and evaluation efforts, systems engineering tasks, and the overall inability to reduce manpower as planned.

TOP CHALLENGES:

- (1) Flight Tests - Critical issues (successful completion of the flight test program to provide sufficient Milestone II data) continue to be addressed to ensure a high probability of success. THAAD has flown seven flights with limited success but continues to ensure acceptable risk prior to each flight. The remainder of the flight test program remains a top challenge.
- (2) THAAD Radar Integration - Integrate the THAAD radar with the THAAD elements for system testing. Associate contractor agreement and Radar Interface Control Working Group are in place and integration continues at WSMR. The radar was integrated with the rest of the system on FT-07 and operated nominally.
- (3) Software Development - A phased software development/release is being implemented to support build-up of flight test objectives. Software is tested in the System Integration Lab (SIL) at Lockheed prior to flight testing.
- (4) Interoperability - The THAAD BM/C4I element must allow

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interoperability with multiple service components. Through the interoperability test system support task, the prime contractor will perform interface testing to demonstrate and validate interface requirements.

(5) Process Improvements - LMMS has initiated numerous process improvements in the areas of quality assurance, system engineering, and configuration management. Improvements in these areas will increase confidence in a successful weapon system development.

28. Unit Cost Report Requirements

Classification: [U]

- a. Contract Cost Baseline Established On:
- b. There have been no breaches of the contract cost baseline.
- c. Variance analysis since baseline report

	Values as of	Values as of Last Unit Cost Breach	Current Values	Changes Since APB	Changes Since Last Unit Cost Breach
Cost Variance					
\$ in millions	N/A	N/A	-169.1	N/A	N/A
Percent (%)	N/A	N/A	-16.89	N/A	N/A
Schedule Variance					
\$ in millions	N/A	N/A	-16.0	N/A	N/A
Percent (%)	N/A	N/A	-1.57	N/A	N/A

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** CONTRACT IDENTIFICATION DATA **

1. PROGRAM NAME THAAD System		2. CONTRACT NAME GBR PDRR		3.CONTRACTOR (NAME & LOCATION) Raytheon Company Electronic Systems Division Bedford, MA 01730-	
4a.CONTRACT NUM DASG60-92-C-0184	4c.CONTRACT TYPE CPIF/AF/FF	4d.CONTRACT DEL TOT QTY: 3 PLAN QTY: 0 DEL QTY: 0		8. TARGET PRICE 557.8 CEILING PRICE N/A	
4b.CHANGE ORDER NUM P00113					
5. PROGRAM PHASE PDRR	6. NEGOTIATED COST: 374.2	7. AUTHORIZED UNPRICED WORK:	9.4		

** CONTRACT SCHEDULE DATA **

9. CONTRACT DEFN DATE: 17 Sep 92		11. CRITICAL MILESTONE 1: COMPLETE SYS TEST SEP 97		12. CRITICAL MILESTONE 2:		13. SIG EFF COMPLETION DATE: SEP 97	
10. WORK START DATE: SEP 92						14. EST COMPLETION DATE: SEP 97	

** CONTRACT PERFORMANCE DATA **

		15. Report Date 26 Jan 97		16. Source Document CPR		17. Data Verification Review Type: SAR Review Date: MAY 93	
18. BCWS 349.4		19. BCWP 348.1		20. ACWP 506.1		21. Mgt Reserve 0.0	
22. Cont Budg Base 383.6		23. Total All Budg 383.6		24. Contr's Est Cost 551.1		25. PM's Est Cost Current: 553.8 Best: 553.8 Worst: 569.9	

** CONTRACT VARIANCE DATA **

Cost Variance = -158.0		Schedule Variance = -1.3	
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27. Contract Comments

[U] (6) Negotiated Cost increased \$2.8M this quarter due to the definitization of a change order.

(7) Authorized Unpriced Work decreased \$2.7M this quarter due to the removal of a change order that was definitized. (The amount of change order was increased \$.1M during negotiations).

(8) Target Price increased \$.2M this quarter due to adjustments made during negotiations of a change order.

(11 - 14) Critical Milestones and Completion Dates changed this quarter. TPO plans to extend the Raytheon effort in support of flight tests through Apr 98; however, the decision has not been made whether to extend the Raytheon contract or to incorporate that effort into the LMMS contract with Raytheon as a subcontractor. Based on this, the dates have been changed to reflect the current contract completion date of Sep 97. Only one critical milestone remains on this contract.

(22) and (23) Contract Budget Base and Total Allocated Budget increased \$.1M this quarter due to an increase in the proposed value of a change order that was definitized.

(24) Contractor's Estimated Cost increased \$.2M this quarter based on adjustments made during negotiations of a change order.

(25) PM's Estimated Cost decreased this quarter based on recent performance trends. Most of the negative cost trends occurred during the development and manufacturing phases of the program. The majority of the remaining effort is associated with test and evaluation at WSMR and USAKA and specific follow-on tasks. The best case and current EAC are based on a completion date of Sep 97, and the worst case is based on risk associated with the flight test program.

The EAC calculated using the cumulative CPI is \$557.8M. Independent analysis by the Raytheon DCMC reflects an EAC of \$546.6M.

Schedule Variance:

The cumulative schedule variance improved by \$.9M this quarter to -\$1.3M or .4% unfavorable through January. The improvement in schedule variance is due to completion of past due software, test and evaluation, and systems engineering tasks. The cumulative negative schedule variance is due to delays in test and evaluation and systems engineering efforts, and past due delivery of PDRR auxiliary equipment.

Cost Variance:

The cumulative cost variance improved by \$2.4M this quarter to -\$158.0M or 45% unfavorable through January. The improvement in cost variance is

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due to milestones achieved in systems engineering, a positive rate adjustment by a subcontractor, and level of effort tasks accumulating schedule (BCWS) and performance (BCWP) with limited actuals (ACWP) in UOES test and evaluation and several other cost accounts. The cumulative negative cost variance is due to increased cost of the antenna equipment, data processing equipment hardware and software, and the extensive test and evaluation effort required at WSMR.

TOP CHALLENGES:

- (1) Flight Test - Participation in a successful flight test as the primary sensor, fully integrated with the other THAAD components. The radar was fully integrated with the THAAD system on FT-07 and operated nominally. However, the flight test as a whole was not successful.
- (2) Hardware/Software Integration - Integration of new builds and additional functionality in the software with the radar hardware is a top challenge. The software must be fully integrated with the PDRR and the UOES radars. This challenge will continue as new builds are delivered throughout the flight test program.
- (3) Alignment and Calibration - Accurately establishing and maintaining the mechanical alignment and electrical calibration of the antenna equipment in order to support angular accuracy requirements and target object maps (TOM) to support the THAAD interceptor within the emplacement timelines established in the ORD.
- (4) Discrimination - To develop a system sensing and discrimination capability consistent with the operational requirement to conduct exo-and endo-atmospheric intercepts.
- (5) Kill Assessment - Providing the THAAD Tactical Operations Center with sufficient data to make a determination of a successful missile intercept of a Tactical Ballistic Missile.

28. Unit Cost Report Requirements

Classification: [U]

- a. Contract Cost Baseline Established On:
- b. There have been no breaches of the contract cost baseline.
- c. Variance analysis since baseline report

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	Values as of	Values as of Last Unit Cost Breach	Current Values	Changes Since APB	Changes Since Last Unit Cost Breach
Cost Variance					
\$ in millions	N/A	N/A	-158.0	N/A	N/A
Percent (%)	N/A	N/A	-45.39	N/A	N/A
Schedule Variance					
\$ in millions	N/A	N/A	-1.3	N/A	N/A
Percent (%)	N/A	N/A	-0.37	N/A	N/A

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March 1997
Prepared: 01 Mar 97

** CONTRACT IDENTIFICATION DATA **

1. PROGRAM NAME THAAD System		2. CONTRACT NAME TMD-Targets Program		3. CONTRACTOR (NAME & LOCATION) Coleman Research Corp.	
4a. CONTRACT NUM DASC50-92-C-0217	4c. CONTRACT TYPE CPFF	4d. CONTRACT DEL TOT QTY: 25 PLAN QTY: DEL QTY:		Launch Systems Orlando, FL 32819-	
4b. CHANGE ORDER NUM P00041				8. TARGET PRICE 219.2	
5. PROGRAM PHASE Fabrication	6. NEGOTIATED COST: 168.8	7. AUTHORIZED UNPRICED WORK: 39.4		CEILING PRICE	

** CONTRACT SCHEDULE DATA **

9. CONTRACT DEFN DATE: 00 00	11. CRITICAL MILESTONE 1: THAAD FT 7 FEB 97	12. CRITICAL MILESTONE 2: THAAD FT 8 JUN 97	13. SIG EFF COMPLETION DATE: JUN 99
10. WORK START DATE:			14. EST COMPLETION DATE: JUN 99

** CONTRACT PERFORMANCE DATA **

	15. Report Date 27 Dec 96	16. Source Document CPR	17. Data Verification Review Type: DEMO Review Date: SEP 94
18. BCWS 139.8	19. BCWP 135.9	20. ACWP 141.3	21. Mgt Reserve 6.2
22. Cont Budg Base 208.2	23. Total All Budg 208.2	24. Contr's Est Cost 208.2	25. PM's Est Cost Current: 214.0 Best: 208.2 Worst: 220.0

** CONTRACT VARIANCE DATA **

Cost Variance =	-5.4	Schedule Variance =	-3.9
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THAAD System
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March 1997
Prepared: 01 Mar 97

27. Contract Comments

28. Unit Cost Report Requirements

Classification: [U]

- a. Contract Cost Baseline Established On:
- b. There have been no breaches of the contract cost baseline.
- c. Variance analysis since baseline report

	Values as of	Values as of Last Unit Cost Breach	Current Values	Changes Since APB	Changes Since Last Unit Cost Breach
Cost Variance					
\$ in millions	N/A	N/A	-5.4	N/A	N/A
Percent (%)	N/A	N/A	-3.97	N/A	N/A
Schedule Variance					
\$ in millions	N/A	N/A	-3.9	N/A	N/A
Percent (%)	N/A	N/A	-2.79	N/A	N/A

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Section 8 - Annual President's Budget Program Funding Summary Prepared: 01 Mar 97

No data entered.

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